

Mars Integrated Propellant Production System, Phase II

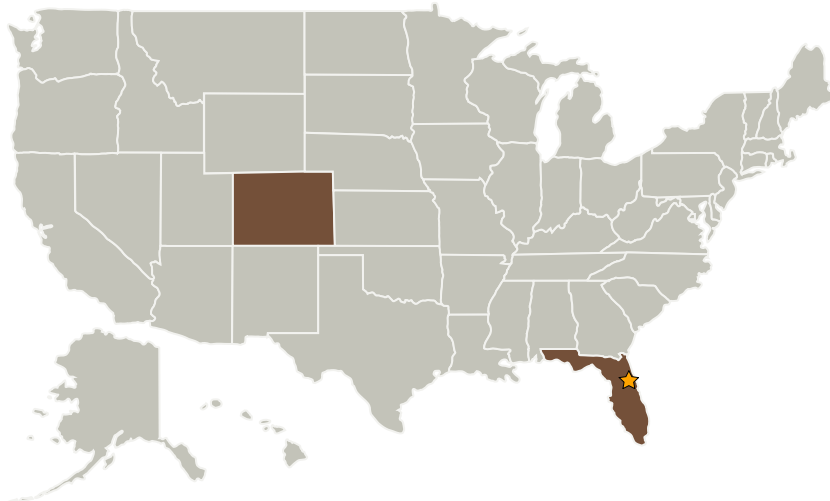
Completed Technology Project (2005 - 2007)



Project Introduction

The Integrated Mars In-Situ Propellant Production System (IMISPPS) is an end-to-end system that will produce rocket propellant on Mars from CO₂ in the Martian atmosphere. The IMISPPS conducts both the Reverse Water Gas Shift (RWGS) and Sabatier (S/RWGS) reactions in a single reactor to produce a useful high-specific impulse fuel (methane plus carbon monoxide) and water, which is condensed and electrolyzed to produce oxygen and hydrogen. The hydrogen is recycled back to the S/RWGS reactor to react with fresh Martian CO₂ to produce more fuel, while the oxygen is stored to provide oxidizer. Some of the carbon monoxide is removed by cryogenic separation to increase propellant specific impulse. The IMISPPS system produces the correct amount of oxygen to burn the methane produced, almost doubling the leverage of a Sabatier/Electrolysis system alone.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Pioneer Astronautics	Supporting Organization	Industry Historically Underutilized Business Zones (HUBZones)	Lakewood, Colorado

Primary U.S. Work Locations

Colorado	Florida
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.1 In-Situ Resource Utilization
 - └ TX07.1.3 Resource Processing for Production of Mission Consumables